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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LEE, SIN J

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 10/03/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/992,560

Applicant(s)

GONSALVES, KENNETH E.

Examiner

Sin J Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-71 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 29,38-50 and 65-68 is/are allowed.
- 6) ☒ Claim(s) 1-5,8-10,12-22,24-28,30-37,51-60,63,64 and 69-71 is/are rejected.
- 7) ☒ Claim(s) 6,7,11,23,61 and 62 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Due to the term "and" on line 5 of present claim 68, it is to be noted that present claim 68 was interpreted by the Examiner to be claiming the polyacetal component which comprises *all* of those polymers listed (i.e, polymer of hexafluoroacetone, trifluoroacetone, hexachloroacetone, trichloroacetone, trifluoroacetaldehyde, trichloroacetaldehyde, thiocarbonylfluoride, hexafluorothioacetone, mixtures thereof, and derivatives thereof).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 14-21, 30-37, 51-59, 63, 64, and 69-71 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 14, 30, 35-37, 51, 58, 59, 63, and 69 are process claims, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 14-21, 30-37, 51-59, 63, 64, and 69-71 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the

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process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

For the purpose of examining those claims on the merit, the Examiner interpreted claim 14 as claiming *any* lithographic processes which involve *any* lithographic recording medium comprising the nanocomposite resist of present claim 1. The Examiner interpreted claim 30 as claiming *any* lithographic processes which involve *any* lithographic recording medium comprising the polymeric chemically amplified resist of present claim 22. The Examiner interpreted claims 35-37 as claiming *any* e-beam, i-beam, and X-ray lithographic processes, respectively, which involve *any* lithographic recording medium comprising the polymeric chemically amplified resist of present claim 22. The Examiner interpreted claim 51 as claiming *any* lithographic process which involves *any* lithographic recording medium comprising the polymeric chemically amplified resist of present claim 38. The Examiner interpreted claims 58 and 59 as claiming *any* extreme UV and X-ray lithographic processes, respectively, which involve *any* lithographic recording medium comprising the polymeric chemically amplified resist of present claim 38. The Examiner interpreted claim 63 as claiming *any* lithographic process which involves *any* lithographic recording medium comprising the polymeric resist of present claim 60. The Examiner interpreted claim 69 as claiming *any* lithographic process which involves *any* lithographic recording medium comprising the polymeric resist of present claim 65.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-5, 8-10, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Kita et al (JP 2000-334881 and its English abstract provided by Japan Patent Office) (with Chacko which is cited here to support the Examiner's assertion that polyhedral oligomeric silsesquioxanes typically have a size range of 0.7 to 50 nm)

The Japanese document has been submitted for English translation. Only the English abstract is available at this time. Kita teaches a mixture of a cage-shaped silsesquioxane and an organic polymer (see the English abstract), and seven different kinds of cage-shaped silsesquioxanes are listed in pg.2-3 of the Japanese document (in those seven formulas, R represents a H atom, an alkyl group, or an aryl group according to PTO's on-site oral translation). Since there are only seven to choose from, one of ordinary skill in the art would immediately envisage a mixture of the cage-shaped silsesquioxane of the formula (1) and an organic polymer. The cage-shaped

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silsesquioxane of the formula (1) is the present polyhedral oligosilsesquioxane of the formula $\text{Si}_8\text{O}_{12}\text{R}_8$ (wherein R represents an alkyl or an aryl group). Therefore, the prior art teaches present inventions of claims 1, 2, and 8-10. Also, since the prior art teaches present nanocomposite resist of claim 1, it is the Examiner's position that the prior art's mixture would inherently have the present glass transition temperature range of claim 13. According to PTO's on-site oral translation of [0057], examples for the organic polymer includes polysilanes. Therefore, the prior art teaches present inventions of claims 3 and 4. Also, polyhedral oligomeric silsesquioxane molecules typically have an approximate size range of 0.7 to 50 nm as evidenced by Chacko, [0021]. Therefore, the prior art teaches present invention of claim 5.

6. Claims 22, 24, 26, and 28 are rejected under 35 U.S.C. 102(e) as being anticipated by Hiraoka et al (6,391,471 B1).

Hiraoka's tri-block copolymer (XIV) in his Example 12 does have a methacrylate component and a polyhedral oligomeric silsesquioxane component (see the second repeating unit of the copolymer), and thus the prior art teaches present invention of claim 22 (present claim language of claim 22 does not require the methacrylate component and the polyhedral oligosilsesquioxane component to be located in two separate repeating units of a polymer). Also, Hiraoka's second repeating unit of the copolymer is the same as the present 3-(3,5,7,9,11,13,15-heptacyclopentylpentacyclo-[9.5.1.1^{3,9}.1^{5,15}.1^{7,13}]octasiloxane-1-yl)propyl methacrylate unit. See present specification, pg.16, lines 5-9 and present Figure 1. Therefore, the prior art teaches present invention of claim 24. Since Hiraoka's tri-block copolymer teaches present

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polymeric resist of claim 22, it is the Examiner's position that the prior art's copolymer would inherently have the present glass transition temperature of claim 26 which is greater than about 165°C. Hiraoka's tri-block copolymer has the Mw/Mn (polydispersity index) value of 1.3. Therefore, the prior art teaches present invention of claim 28.

7. Claims 22, 25-27 are rejected under 35 U.S.C. 102(e) as being anticipated by Sellinger et al (6,517,958 B1).

Sellinger teaches (see col.5, lines 1-5, lines 18-42) an organic-inorganic HLED material having the general formula $(\text{RSiO}_{1.5})_n$ and having an octahedral silsesquioxane structure shown in col.5, lines 20-34. Sellinger teaches that the silsesquioxane can be *polymeric* with n being up to about 100. Based on this teaching, it is the Examiner's position that one of ordinary skill in the art would immediately envisage a polymeric silsesquioxane $(\text{RSiO}_{1.5})_n$, with n being 100. Also, Sellinger teaches that in the octahedral silsesquioxane structure, R_1 - R_8 can be selected from hole transport moieties, electron transport moieties, emissive material moieties, and curable groups including epoxy, *methacrylate* ($-\text{O}-\text{C}(=\text{O})-\text{C}(\text{H})=\text{C}(\text{H})(\text{CH}_3)$), styryl, vinyl, propargyl and combinations thereof. Since there are only several choices given, it is the Examiner's position that one of ordinary skill in the art would immediately envisage those R_1 - R_8 groups to be methacrylate groups. Therefore, Sellinger's polymeric silsesquioxane includes the methacrylate component as well as the polyhedral oligosilsesquioxane component, and thus the prior art teaches present invention of claim 22 (present claim language of claim 22 does not require the methacrylate component and the polyhedral oligosilsesquioxane component to be located in two separate repeating units of a

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polymer). Since Sellinger's polymeric silsesquioxane teaches present polymeric resist of claim 22, it is the Examiner's position that the prior art's polymeric silsesquioxane would inherently have the present glass transition temperature of claim 26 which is greater than about 165°C.

With respect to present claims 25 and 27, when those R₁-R₈ groups are methacrylate (-O-C(=O)-C(H)=C(H)(CH₃)) groups and when n is 100, the molecular weight for the polymeric, octahedral silsesquioxane structure shown in col.5, lines 20-34 would be 109,600 (as calculated by the Examiner) with the molecular weight for the octahedral silsesquioxane component (excluding those R groups) being 41,600 (which is about 38% by weight of the polymer). Therefore, the prior art teaches present inventions of claims 25 and 27.

8. Claims 60 and 63 are rejected under 35 U.S.C. 102(b) as being anticipated by Barzynski et al (3,849,137).

Barzynski teaches (col.1, lines 5-11) a photosensitive coating material (used for positive-working *lithographic* printing plates and as *photoresist*) which consists essentially of a polymer containing o-nitrocarbinol ester groups. This polymer containing o-nitrocarbinol ester groups enters into a *photochemical reaction* under the action of *light* in which the ester group is split and a *free carboxyl group (i.e., a carboxylic acid group)* is formed, which the result that the solubility of the material is decisively changed by exposure. See col.4, lines 13-20. Therefore, the prior art teaches present inventions of claims 60 and 63.

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Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kita et al (JP 2000-334881 and its English abstract provided by Japan Patent Office).

Kita et al is discussed above in Paragraph 5. Although the English abstract does not teach the amount of the cage-shaped silsesquioxane to be mixed with the organic polymer, the present range for the amount of the nanoparticle component would have been obvious to one of ordinary skill in the art, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)), and since in Kita, the cage-shaped silsesquioxane is being added to obtain a film low in refractive index and dielectric constant. Therefore, Kita would render obvious present invention of claim 12.

Allowable Subject Matter

11. Claims 6, 7, 11, 23, 61, and 62 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Kita et al do not teach present inventions of claims 6, 7, and the prior art does not teach or suggest present

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polymer of claim 11 either. Although Hiraoka's block copolymer (XIV) comprises a methacrylate component, it does not comprise methyl methacrylate, t-butyl methacrylate, methacrylic acid, or combinations thereof as presently claimed in claim 23. Also, although Sellinger's polymeric octahedral silsesquioxane does comprise methacrylate components, it does not comprise methyl methacrylate, t-butyl methacrylate, methacrylic acid, or combinations thereof as presently claimed in claim 23. Barzynski does not teach presently claimed photoacid generating component of claims 61 and 62.

12. Claims 29, 38-50, 65-68 are allowed. Hiraoka does not teach or suggest present polymeric resist of claim 29. Sellinger does not teach or suggest present polymeric resist of claim 29. Although Barzynski teaches a polymer which comprises a photoacid generating component, the polymer does not include the presently required methacrylate component of claim 38. None of the cited prior arts (Hiraoka, Sellinger or Barzynski) teaches or suggests the present polymeric resist of claim 49. None of the cited prior arts teaches or suggest the present polymeric resist of claim 65.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is (703) 305-0504. The examiner can normally be reached on Monday-Friday from 8:30 am EST to 5:00 pm EST.

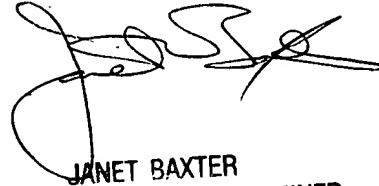
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Janet Baxter, can be reached on (703) 308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9311 for after final responses or (703) 872-9310 for before final responses.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0661.

S. J. L.

S. Lee
9/22/03



JANET BAXTER
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